

Evaluation of a strut top mount for a magnesium space frame structure for mainstream road cars.

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Abstract

The widespread use of magnesium castings in mainstream road vehicles is one way of reducing vehicle mass and hence fuel consumption. The use of magnesium alloys could be encouraged by a gradual improvement in the technical support available. The design limits could be stress based, but with better failure criteria, such as Christensen proposed. These criteria are more sophisticated than Von Mises and could provide a useful addition to the safety margin. In addition, the application of damage models caused by the growth and amalgamation of inclusions, will allow fatigue life and stress corrosion estimates to be refined. As better alloys and alloy systems become available, and the cost per kilogram weight saved increases, there should be enough of a margin to justify the increased design and analysis costs. Finally, vehicle quality and consistency will begin to improve pulling residual values and recycling activity upwards. Casting frames, joints and beams will reduce the structural variability of vehicle body structures. This should enhance vehicle safety, dynamics and refinement, and the proposition of car ownership in future.

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